SUPERFUND RESPONSE ACTION PRIORITY PANEL REVIEW FORM

Date Form Completed: 10/17/2011

General Site Information

Region:	Region 1	City:	Ashland	State:	MA
CERCLIS EPA ID:	MAD990685422		CERCLIS Site Name:	Nyanza Chemical Waste Dump	
NPL Status: (P/F/D)	Final (F)		Year Listed to NPL:	1983	

Brief Site Description: *(Site Type, Current and Future Land Use, General Site Contaminant and Media Info, Site Area and Location information.)*

The Nyanza Chemical Waste Dump Site (Nyanza or Site) is a 35-acre parcel of land located adjacent to an active industrial complex in Ashland, Massachusetts. The Site was occupied from 1917 through 1978 by several companies that manufactured textile dyes and dye intermediates. Nyanza Chemical Inc. operated on this Site from 1965 until all operations ceased in 1978. Large volumes of chemical waste were disposed in burial pits, tanks, and various lagoons. Wastes included partially-treated process water, chemical sludge, solid process wastes, and numerous organic and inorganic chemicals (including mercury). Process chemicals that could not be reused or recycled were either disposed of on-site on Megunko "hill" or discharged to the Sudbury River through a collection of small streams and culverts.

The current owner, Megunko Transit District, LLC, leases the old plant grounds to Nyacol Nano Technologies. Approximately 10,000 people live within 3 miles of the site. The Site has been divided into four Operable Units as follows;

- OU1 – Excavation and on-site disposal of *sediment* and *sludge*,
- OU2 – All *Groundwater* and *indoor air*,
- OU3 – Excavation and on-site disposal of additional *sediment*, and
- OU4 – Sudbury River *sediment* and *surface water*.

The selected remedy addresses mercury contamination in fish tissue which is where mercury from the river accumulates and presents the only unacceptable risk to human health (if regularly ingested). There is no unacceptable human health risk attributable to either contact or incidental ingestion of surface water or sediment. Consistent with other remedies at contaminated sediment sites, this remedy relies on a combination of different remedial approaches which apply specific "reaches" of the river. The remedy includes: Enhanced Natural Recovery (ENR) via thin-layer sand capping over an 84-acre impounded portion of the river, monitoring, and institutional controls such as posting warning signs and increasing public outreach and awareness.

General Project Information

Type of Action:	Remedial			Site Charging SSID:	0115
Operable Unit:	OU4		CERCLIS Action RAT Code:	RA004	

Is this the final action for the site that will result in a site construction completion? ☒ Yes ☐ No

Will implementation of this action result in the Environmental Indicator for Human Exposure being brought under control? ☐ Yes ☒ No*

**HE already "under control" however relies on warning signs of unknown effectiveness (OU4).*

Response Action Summary

Describe briefly site activities conducted in the past or currently underway:

Nyanza Chemical Waste Dump consists of four OUs. OU1 was completed in the early 1990's and consisted of consolidation of waste from lagoons, pits, and vaults onto a pre-existing "landfill" [i.e., disposal area] and the construction of an impermeable cap over the consolidated waste. OU3 was completed in 2001 and consisted of the excavation of contaminated sediment from a collection of wetlands, brooks, and outfalls. This waste was then placed within the limits of the landfill and recapped. Both OU1 and OU3 are in long-term O & M phase under the supervision of the Commonwealth of Massachusetts.

Of the two remaining "active" OUs, OU2 addresses contaminated groundwater. EPA modified its remedy in 2006 by an ESD to include the installation of vapor mitigation systems in 39 homes. This was required based on concentrations of VOCs in groundwater above screening levels; this was completed in 2008. EPA continues to assess the contaminant plume and is in the process of installing a DNAPL collection system at certain wells.

With regard to OU4 (Sudbury River) the ROD was signed in 2010, after nearly 20 years of evaluation. A Remedial Design is being prepared by contractors to the U.S. Army Corp of Engineers and will be complete in FY2012.

Specifically identify the discrete activities and site areas to be considered by this panel evaluation:

Construction activities associated with OU4 (Sudbury River) are the focus of this funding request and panel evaluation. The OU4 remedy is a combination remedy consisting of public outreach/awareness in 6 communities; and periodic monitoring for mercury in sediment, surface water and fish tissue along the 26-mile length of the river. In addition, where risk and mercury concentrations are highest, it also includes thin-layer sand capping (i.e., Enhanced Natural Recovery). This funding request will allow for construction of the thin-layer sand cap over an 84 acres (impounded section) of the Sudbury River known also as Framingham Reservoir No. 2.

Briefly describe additional work remaining at the site for construction completion after completion of discrete activities being ranked:

OU4 remedy construction (thin layer capping) is the final remedial construction associate with this Superfund Site.

Response Action Cost

Total Cost of Proposed Response Action:

($ amount should represent total funding need for new RA funding from national allowance above and beyond those funds anticipated to be utilized through special accounts or State Superfund Contracts.)

$8.5 Million

Source of Proposed Response Action Cost Amount:

(ROD, 30%, 60%, 90% RD, Contract Bid, USACE estimate, etc…)

Record of Decision

Breakout of Total Action Cost Planned Annual Need by Fiscal Year:

(If the estimated cost of the response action exceeds $10 million, please provide multiple funding scenarios for fiscal year needs; general planned annual need scenario, maximum funding scenario, and minimum funding scenario.)

$5.0M (FY2012)

$2.5 M (FY2013)

$1.0 M (FY2014)

Other information or assumptions associated with cost estimates?

The total estimate ($8.5 Million) is/was based on the estimates prepared by EPA contractors and described in the FS. This estimated cost was reviewed by CSTAG; CSTAG was in general agreement with this cost estimate.

Readiness Criteria

1. Date State Superfund Contract or State Cooperative Agreement will be signed (Month)?

September 2012

2. If Non-Time Critical, is State cost sharing (provide details)?

NA

3. If Remedial Action, when will Remedial Design be 95% complete?

June 2012

4. When will Region be able to obligate money to the site?

September 2012

5. Estimate when on-site construction activities will begin:

Spring 2013

6. Has CERCLIS been updated to consistently reflect project cost/readiness information?

Yes

Site/Project Name:	**Nyanza Chemical Waste Dump OU4**

Criteria #1 - RISKS TO HUMAN POPULATION EXPOSED (Weight Factor = 5)

Describe the exposure scenario(s) driving the risk and remedy. Include risk and exposure information on current/future use, on-site/off-site, media, exposure route, and receptors:

The risks at Nyanza (OU4) are unique. The sole actionable risk is from the consumption of mercury-contaminated fish. EPA estimated the reasonable maximally exposed (RME) individual by estimating the number of fish meals a "recreational angler" might consume. To do so, EPA relied on "creel survey" from other similar water bodies in New England. As summarized in the 2008 Human Health Risk Assessment, the RME individual is a child who is assumed

to eat 12 fish meals per year from the Sudbury River. The risk was highest in that section of river where the thin layer sand cap was selected as a remedy. Other river "reaches" (downstream) have a generally decreasing level of risk, and some downstream reaches do not present any risk (using the same exposure assumptions described above).

Estimate the number of people reasonably anticipated to be exposed in the absence of any future EPA action for each medium for the following time frames:

MEDIUM	<2yrs	<10yrs	>10yrs
Fish Tissue	Unknown	Unknown	Unknown

Discuss the likelihood that the above exposures will occur:

It is impossible to provide any estimate with regard to the anticipated number of individuals whom might be exposed in the absence of the completed remedy. Framingham has a population of 60,000 with an estimate additional 20,000 undocumented illegal immigrants (predominantly of Brazilian ethnicity). Thus - 80,000 individuals are located in Framingham alone where the concentration of mercury in sediment and fish is the greatest. Further, the likelihood of consuming one's catch is greater in these minority-rich communities based on cultural differences and economic hardships. Framingham is considered an Environmental Justice community.

Other Risk/Exposure Information?

None

Site/Project Name: **Nyanza Chemical Waste Dump**

Criteria #2 – SITE/CONTAMINANT STABILITY (Weight Factor = 5)

Describe the means/likelihood that contamination could impact other areas/media given current containment:

There are two principal sources of mercury to the Sudbury River, these include: 1) atmospheric sources that have resulted in regional degradation of water quality and 2) historic Nyanza sources. The mercury attributable to Nyanza's operation(s) has preferentially settled behind the first impounding structure downstream, namely the Framingham Reservoir No. 2 dam. Since the facility last operated (1978) nearly 30 years of natural processes (i.e. sedimentation) have resulted in the highest concentrations of mercury now being 2-4 cm below the sediment surface. Although the mercury is slowly being diluted with cleaner sediment, it is not considered to be "contained".

Although not "contained" per se, the migration (via resuspension) of this mercury is very unlikely given the low flow and long residence time of water in this portion of the river [due to it being an impoundment]. Analysis of sediment cores reveal that there have not been any significant resuspension "events" dating back over 100 years.

Are the contaminants contained in engineered structure(s) that currently prevents migration of contaminants? Is this structure sound and likely to maintain its integrity?

No – the mercury (i.e., contaminated sediment) is not contained in an engineered structure per se, excepting that the dam itself (which reduces surface water velocity) has resulted in the mercury-contaminated sediment to remain quite stable. The Commonwealth of Massachusetts owns this dam and conducts routine inspection and maintenance.

Are the contaminants in a physical form that limits the potential to migrate from the site? Is this physical condition reversible or permanent?

Mercury is mixed with sediment. Mercury-contaminated sediment *could* migrate downstream in the event of severe weather event or damn failure – neither of which is likely based on routine inspection and maintenance of the dam, and the depositional history of sediment determined through sediment cores (described above).

Are there institutional physical controls that currently prevent exposure to contamination? How reliable is it estimated to be?

There are institutional controls consisting of advisories issues by Massachusetts Department of Public Health as well as warning signs cautioning against the consumption of Sudbury River fish; these are installed along the entire length of the river an inspected annually.

Other information on site/contaminant stability?

None

Site/Project Name:	**Nyanza Chemical Waste Dump**

Criteria #3 – CONTAMINANT CHARACTERISTICS (Weight Factor = 3)

(Concentration, toxicity, and volume or area contaminated above health based levels)

List Principle Contaminants (Please provide average and high concentrations.):

(Provide upper end concentration (e.g. 95% upper confidence level for the mean, as is used in a risk assessment, or maximum value [assuming it is not a true outlier], along with a measure of how values are distributed {e.g. standard deviation} or a central tendency values [e.g., average].)

Contaminant	***Media**	****Concentrations**
Mercury	Sediment	44 ppm
MethylMercury	Fish tissue	>1 ppm

*(*Media: AR – Air, SL – Soil, ST – Sediment, GW – Groundwater, SW – Surface Water)*

*(**Concentrations: Provide concentration measure used in the risk assessment and Record of Decision as the basis for the remedy.)*

Describe the characteristics of the contaminant with regards to its inherent toxicity and the significance of the concentrations and amount of the contaminant to site risk. *(Please include the clean up level of the contaminants discussed.)*

Significant amount of mercury were historically discharged to the Sudbury River. Based on 17 years of evaluation, it is known that the majority the Nyanza-related mercury has settled behind the Framingham Reservoir No. 2 Dam. Concentrations within this portion of the river are consistently above 20 ppm (average concentration = 27 ppm) with max measured concentration of 44 ppm, where as background concentration are typically less than 1 ppm. Consistent with distribution of mercury in sediment, fish from Framingham Reservoir No. 2 have the highest levels of methylmercury, thus consumption of these fish by recreational anglers represent the great potential health risk. The fish tissue remediation goal is 0.48 ppm.

Describe any additional information on contaminant concentrations which could provide a better context for the distribution, amount, and/or extent of site contamination. *(e.g. frequency of detection/outlier concentrations, exposure point concentrations, maximum or average concentration values, etc…..)*
NA
Other information on contaminant characteristics?
The contaminant in the river which drives an unacceptable risk is mercury; however, the species of mercury which bioaccumulates in biota (fish) is methylmercury. This is an area of active and significant new research as there are many, many factors that contribute and/or control the rate of mercury methylation. The Sudbury River itself has disparate levels of mercury methylation as is evidenced by the higher concentrations of mercury in fish in the National wildlife refuge as compared to the total available mercury in sediment. In sum, expansive wetland that periodically flood are prone to higher rates of methylation whereas fast moving, well oxygenated portions are not. Based on literature review "lakes" such the Framingham Reservoir are moderate methylmercury producers. The addition of sand will help to dilute the high concentrations of mercury as well as push this source of mercury out of the biologically-active zone (considered to be the top 6 inches).

Site/Project Name:	Nyanza Chemical Waste Dump

Criteria #4 – THREAT TO SIGNIFICANT ENVIRONMENT (Weight Factor = 3)

(Endangered species or their critical habitats, sensitive environmental areas.)

Describe any observed or predicted adverse impacts on ecological receptors including their ecological significance, the likelihood of impacts occurring, and the estimated size of impacted area:

The concentration of total mercury in sediment or methylmercury in biota did not trigger a risk of adverse health effects in any ecological measurement endpoint. Over 200 measurement endpoints were assessed including fish, crayfish, mussels, birds, and mammals.

Would natural recovery occur if no action was taken? ☒ Yes ☐ No
If yes, estimate how long this would take.

Monitored Natural Recovery (MNR) was evaluated alongside other active remedial alternatives (containment, dredging, etc…). As noted previously, natural processes have contributed to the highest concentrations slowly being buried by new sediment (sedimentation rate 0.04 cm /year). Natural recovery was projected to be effective (over a reasonable timeframe - such as 30 years) in reducing fish tissue for most portions of the river – not withstanding other atmospheric sources which remain a potentially confounding factor. With regard to Framingham Reservoir No. 2, natural recovery was estimated using a site-specific computer model to take as long as 70 years.

Other information on threat to significant environment?

There are no threats to the environment – rather only unacceptable human health risk based on the consumption of mercury-contaminated fish.

Site/Project Name:	

Criteria #5 – PROGRAMMATIC CONSIDERATIONS (Weight Factor = 4)

(Innovative technologies, state/community acceptance, environmental justice, redevelopment, construction completion, economic redevelopment.)

Describe the degree to which the community accepts the response action.

The remedy has highly-variable support. In general, local resident and municipal leaders have concerns about the effectiveness of thin-layer capping and thus favored removal via hydraulic dredging. As was described in the FS and ROD, dredging was not projected to be any more effective than thin-layer capping at a substantially greater cost ($50 - 250 Million depending on areal extent). Notwithstanding these concerns, support was received from local organizations, F&WS, and NOAA. The region continues to work cooperatively with the Town during the Remedial Design.

Describe the degree to which the State accepts the response action.

The State concurred with the remedy decision. In addition, the region is working closely with the Massachusetts Department of Recreation and Conservation (MassDCR), owners of the reservoir and the agency responsible for dam maintenance.

Describe other programmatic considerations, e.g.; natural resource damage claim pending, Brownfields site, use of innovative technology, construction completion, economic redevelopment, environmental justice, etc…
A NRD settlement was obtained in 1995 (3.5M). Trustees for the settlement include NOAA, F&WS and MassDEP. Concurrently with EPA evaluation of clean-up alternatives, the Trustees have solicited restoration project within the watershed to compensate for these damages. To date, the final restoration projects have not been selected. There is no known or reasonably foreseeable Brownfield assessment or reuse plan although the Reservoir itself, despite being "managed" by the State Agency for water supply and dam safety, has not been designated as a emergency water supply since the 1970s. Thus some discussion and many proposed NRD restoration projects contemplate increased public access to this reservoir (specifically) and the Sudbury River (in general). Thin-layer sand capping is a not an innovative technology. With regard to EJ, the river itself does not transect any EJ areas; however, both low income and minority populations are located in very close proximity. As mentioned previously Framingham does contain EJ communities, and has a high percentage of immigrants (estimate at over 20,000) many of which routinely fish from local water bodies (including the Sudbury River) for food.